were used in a wall. At this time the Temple of Peace, the Pantheon, and all the thermæ were of burnt brick.

M. Quatremere de Quincy, in his "Encyclopedie Methodique," observes that in his researches among the antique buildings of Rome, he has found bricks of three sizes; the least were 7½ inches square and 1½ in. thick; the medium ones 16½ inches square and from 18 to 20 lines in thickness; and the larger ones 22 inches square by 21 to 22 lines thick. The smaller bricks were made to face walls of rubble-work; and to make a better bond with the wall, they were cut diagonally into two triangles, the longer side was placed on the outside, and the point towards the interior of the work. To tie more effectually the facing with the rubble, they placed at every four feet in height one or two courses of the large square bricks. The large bricks were also used in arches of openings or discharge, which were necessary in the building.

The material of Persian buildings in modern times, says Chardin, is bricks, either dried in the sun, or burnt in the fire. The tiles or bricks of earth are made in their wooden moulds, 8 inches long, 6 wide, and 2½ thick. The labourers temper with their feet the earth, which is generally mixed with straw cut very small. They pass their hands over them to smooth them, after having dipped them in a vessel of water mixed with straw, still finer than was at first used. Then taking off the mould, they leave the bricks to dry for two or three hours, after which they are ranged over one another, where they remain till the drying is completed.

The baked bricks are made of two parts of earth and one of cinders, well tempered together, in moulds larger than for the others. They leave them then to dry in the sun for several days, then place them in a large furnace, ranged one over the other, at some distance, which they fill with plaster. They close the furnace, and light the fire, which is kept up for three days and three nights. Mr. Chardin has not, however, informed us what kind of cinder it is they use; the use of coal is not known among them, we, therefore, presume he means wood-ash, or the cinder of burnt bituminous bodies.

It is generally admitted that the Romans introduced the art of brickmaking into this country, for we have no account of any being used prior to the Roman Conquest. Nor does it appear that the Romans employed this material otherwise than when compelled to do so in the absence of other material. The Roman walls were generally built with cement and tiles, or flint stones laid in courses at convenient distances to bind the parts together, and at the external and internal angles, to strengthen them. These bands consisted of three or four courses of tiles or stones laid through the wall, and were placed at two or three feet from each other; the intermediate spaces being raised by a sort of cement composed of mortar and pebbles, and sometimes of rag-stones, or such materials as the country afforded. In this manner the walls of Verulam, Colchester, Chesterford, and other places, were built. Alberti tells us, on the authority of Varro, that the Gauls built their houses with baked brick, but this does not correspond at all with the ancient simplicity of those people, for the use of this material always implies a certain advance in civilization; on the other hand, in places where other material could not be procured, it is very probable they had recourse to unburned brick or mud.

It is very certain that brick was scarcely used as a building-material in the towns and cities previous to the time of King Alfred, for we read that in his time the capital having twice been laid in ashes to his great grief and mortification, as defeating his efforts for civilizing and improving the social condition of his people, he therefore commanded after the second conflagration that the houses should in future be of brick or stone, he himself setting the example, by building his palaces of these materials, and the nobility following his example. The citizens, however, do not seem to have complied with this mandate, for it was not until the reign of Henry VII. that any considerable progress was made in brick building. In fact, in these dark feudal ages, stone was almost invariably chosen by the Saxon and Norman nobles, as being more adapted to the warlike habits, and offering greater strength and consequent security. Mr. Essex remarks, "That the Saxons sometimes built of bricks and cement, after the Roman manner, and sometimes with squared stone, may be collected from Bede's description of the Hermitage built by St. Cuthbert in his retirement, the walls of which, he says, were not of squared stone, nor of tiles and cement, but of such rough materials as he could dig on the spot. In this description Bede intended to convey the meanness of St. Cuthbert's habitation, by comparing it with other buildings of that age, many of which were built of squared stones, and others with tiles and cement;" from whence we may conclude that the art of making tiles, or bricks as they are now called, was not forgotten from the time the Romans left Britain to the seventh century, when St. Cuthbert lived.

In the wall which went nearly round the city of Verulam, the Roman bricks are interlaid in separate courses between layers of flints. The quantity of mortar between the bricks is nearly equal to the thickness of the bricks themselves. Four layers were discernible; the lowest tier had four bricks, the next three, and the two uppermost of them two. The distances between the courses of bricks, which were filled up with flint and mortar, were 2 feet 8 inches, the bricks were 1½ in. or 1¼ in. thick, 12, 16, 17, and 18 inches long. This deviation from the common Roman standard would lead us to infer that while the art of tile-making was received and carried out by the Romans, they neglected the measurement. Pliny, however, gives us an account of the Roman measures somewhat different from Vitruvius; he states that there were three sorts of brick, the lydion, 18 inches long and 12 broad; the tetradorus, and pentadorus; the dorus was a palm.

The earliest period fixed by the dean of Exeter for the revival of the art in Britain, was about King Richard II.'s reign, which, by the way, he observes confirms Dr. Ward's opinion, that the date on the brick chimney at Salford, in Bucks, should be read 1382, instead of 1182, which falls under the fifth of that king's reign. Leland says "That in King Richard the II.'s days, the town of Kingston-on-Hull waxed very rich, and Michael de la Pole, merchant there, was made Count of Suffolk; in whose time the tower was wonderfully augmented in building, and was enclosed with ditches, and the wall begun, and in continuance endyd and made all of *brike*, as most part of the houses of the town at that time was. In the waul," adds the writer, "be four principal gates of brike; the north gate having four wardes, between the which and Beverle-gate be twelve tours (towers) of bricke, yn one of them a posterne. Betwixt Miton-gate and Hazelle-gate there be three tours of brike, and from them to the Haven Mouth be five tours of brike. Michael de la Pole builded a goodly house of brike again the north end of St. Mary's Church like a palace, with goodly orchard and garden enclosed with brike. He also builded 3 houses beside in the towne, whereof every one has a tour of brike. Trinite Church, most made of brike, is larger and fanir a great deal than St. Mary's."

This fact goes far to prove that brick was extensively used, so far as regards the above town, in the reign of Richard II., but, from this time to the reign of Henry VII., we meet with no evidence of brick being employed as a building material; possibly it was confined to this place, for from all we can learn, with the exception of a few lordly mansions, London was chiefly built of wood. ARGIL.

*(To be continued.)*

## ON THE ADVANTAGES OF TURNING CANALS INTO RAILWAYS.

MR. T. BERMINGHAM read a paper on the above subject at the recent scientific meeting at York. He commenced by observing that it was fortunate that the immense sums of money which had been expended on the canals in England and Ireland need not be entirely lost to the proprietors, and consequently in a great degree become useless to the country; but that, on the contrary, by the proper application of some of the various systems of railways at present proposed, the greatest blessing might be conferred upon the counties, if it could be shewn, as he thought he should be able to do, that a cheap and expeditious, and, above all, a safe and easy mode of conveyance could be made out of these great lines of canals. At the present moment, and in Ireland in particular, subsoil draining was most fortunately occupying the undivided attention of all classes of agriculturalists. He therefore proposed so to construct the railways as at the same time to make what was formerly a canal into a drain for the waters of the country, instead of, as now, in many places, especially in the case of the canal under consideration, acting as back-water upon the land, often to the very great detriment of all. His proposition was this: that the bottom of the canal should be levelled to a reasonable inclination at the various locks, that one of the present proposed systems of railways should be adopted, and that the waters which found their way into the canal should be made use of as the power, or in aid of the power, by which it should be determined that the trains should be propelled upon the railway. The advantages suggested were these: that the capital invested in canals would not be altogether lost; that though in many instances canals made a circuit between towns and districts at present populous, still the best levels had been taken, and the public had found their way to those canals; that instead of the waters in our lakes, and rivers, and streams, and springs being kept up for the purposes of the canals to a level injurious to the proper cultivation and management of our land, the canal itself would become the main drain for these very lands; that the adoption of this scheme would prove a source of employment for our peasantry, and be productive, by draining, of a vast increase of food for the sustenance of our people; and that considerable gain would ensue to the capitalists who might be induced to embark their money in the speculation.

## BATHS AND WASHHOUSES FOR THE WORKING CLASSES.

ON Wednesday last a numerous and highly influential meeting was held in the Egyptian Hall, at the Mansion-house, to take into consideration the best means of promoting the establishment of baths and washhouses for the labouring classes.

The body of the hall was filled, and on the dais at the upper end of the room were the Lord Bishop of London, Lord Dudley Stuart, Archdeacon Wilberforce, Archdeacon Hale, Sir W. Clay, M.P., G. Byng, Esq., M.P. for Middlesex, J. C. Colquhoun, Esq., M.P., Sir Lionel Goldsmid, Mr. D. Salomons, Alderman Johnson, Dr. Russell, Mr. Moon, the late Sheriff, R. Cotton, Esq., the Governor of the Bank of England, Mr. G. F. Young, and Mr. D. Wire.

At two o'clock the Lord Mayor entered the hall, and took the chair, when various resolutions were carried, having for their object the establishment of an association to carry the proposed measures into effect. A president, trustees, and committee of management were appointed, and a public subscription determined upon.

The Bishop of London accepted the office of president.

BENEVOLENT INSTITUTION FOR THE RELIEF OF AGED AND INFIRM CARPENTERS. — The fifth annual meeting of the members of this excellent institution was held on Monday the 14th instant, at Radley's Hotel, Bridge-street, Blackfriars, when Mr. W. Shimell, junior, took the chair. Mr. Wood, the secretary, read the directors' report for the last half-year, which stated that the institution was in a most prosperous condition, and would have been still more so had not the authorities of the Brighton Railway acted most improperly on the occasion of the last excursion. Thanks having been voted to those gentlemen who had most exerted themselves since the last meeting for the good of the society, the election of officers for the ensuing year took place, after which Mr. Munyard, in a neat and complimentary speech, drew the attention of those present to the untiring perseverance of their secretary, Mr. W. Wood, and attributed the prosperous condition of the institution mainly to his active and judicious superintendence.

MILITARY PRISONS.—Southsea Castle is ordered to be appropriated as a military prison, to contain 100 offenders. Another building at Wheedon, and a third elsewhere, are also to be fitted for the same object. The estimated outlay for these arrangements is 4,000*l*.—*Sun.*

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